

“Over the past several years, a number of my colleagues and I have spent considerable time studying the issue of climate change. We have traveled around the globe to see first hand the impacts of climate change and how it is changing the lives of people even as we speak. I am pleased to have visited Alaska, Antarctica, Australia, Canada, New Zealand, South America, Norway, and other parts of the Arctic region. Let me say, if anyone remains in doubt that climate change is real, I invite them to visit some of these places to see for themselves. “

Senator John McCain testifying before the Senate Committee on Environment and Public Works on the subject of Global Warming, January 30, 2007 (Source: Senator McCain’s Website.)

2008 Science Committee Congressional Delegation to Antarctica

Personal Report of Congressman Brian Baird
Chair, Research and Education Subcommittee

Background

As part of our oversight responsibilities, members of the Science Committee have a longstanding practice of periodically traveling to Antarctica and the South Pole to visit with researchers and observe the work being funded by the National Science Foundation (NSF). Since 1959, there have been 34 official House/Senate trips to Antarctica under the auspices of the U.S. Antarctica Program.

Typically, the House Science and Technology Committee trip takes place every other year. In 2006, (now former) Science Committee Chairman Sherwood Boehlert, led a delegation of ten members along with staff on a multi-day trip to Antarctica, Australia, and New Zealand. The trip in 2006 was Boehlert’s second to the pole.

During the 110th Congress, I chaired the House Science and Technology’s Subcommittee on Research and Education. This subcommittee has oversight responsibilities for the NSF; the largest single financial commitment of the NSF goes toward its Antarctica program. Collectively, the United States spends more than \$1 billion in total infrastructure investments in Antarctica, as well as almost a quarter of a billion dollars annually for logistics, and more than \$70 million per year spent for scientific research. This investment is essential to maintaining U.S. scientific leadership and a continued presence on the continent and at the South Pole.

2008 had special significance because 2007-2008 marked the [International Polar Year](#) (IPY). This is an international research event that had not occurred since 1957-58 and has only taken place three times in the past 125 years. The IPY brings scientists from

around the world together to study the latest scientific findings relative to the two Polar Regions. This rare occasion provides a unique global opportunity to review scientific research and chart a course for the future. In my role as subcommittee chair with NSF oversight, I was invited to speak at the United States opening events for IPY, held at the National Academies of Science building on February 26, 2007. During that event and in the months that followed I met with a number of polar researchers and closely followed the work being performed there.

2008 was also an important year for the U.S. Antarctica mission because the new Amundsen-Scott South Pole Station. The station had been under construction for more than a decade; it was officially dedicated on January 12, 2008. This remarkable facility hosts scientists performing some of the worlds most advanced research in [physics](#), [microwave telescope observations](#), ozone holes, atmospheric carbon dioxide, and other studies which literally cannot be performed in the same way anywhere else on earth. For more information about additional studies being performed in Antarctica, see the website of the [United States Antarctic Program](#).

Official Science Committee Travel to Antarctica

When a more senior colleague was unable to lead a scheduled Science Committee trip to Antarctica in January of 2008, I was asked to serve as trip leader. I was chosen because of my interest in issues related to the science at the poles and in my capacity as Chair of the subcommittee with jurisdiction over the NSF. Although I had not initiated or planned the trip from the outset, given our subcommittee jurisdiction and my involvement with the IPY, I was eager to accept the responsibility and grateful for the opportunity.

As we began to prepare for the trip, I consulted closely with administrative and scientific staff at NSF and arranged special briefings for colleagues who would be making the journey. In light of our committee's role in studying climate change and related issues, I was particularly interested in the unique possibility of visiting three critical and vulnerable ecosystems in one trip.

Prior trips to the Polar region had also stopped at New Zealand, which is necessary as the jump-off point for the trip to [McMurdo Station](#) on Antarctica. It is also common for trips to travel to nearby Australia. Australia is unique in that it affords a chance to visit, from one location, both a rainforest and a coral reef, two of the ecosystems most threatened by climate change. The Great Barrier Reef was of special interest as I have followed very closely and with substantial concern the growing research on the impacts of temperature change and acidification on coral health. Indeed, during my time in Congress I have authored and passed legislation on ocean acidification, harmful algal blooms and invasive species.

Because of the importance of these dangers, the NSF and the National Oceanic and Atmospheric Administration (NOAA) are funding cutting edge research and supporting

U.S. scientists working in close collaboration with other leading researchers studying the Great Barrier Reef system.

As we planned our trip, we arranged to meet with these researchers, including one scientist named Ove-Hoegh Guldberg, who had recently authored the cover article for Science Magazine's issue dealing with the phenomenon of coral bleaching. The chance for our committee to meet with this research team, see first hand what they are studying, discuss with them why they are studying it, and learn what it means for the planet was extraordinary.

Our Journey to Antarctica

We departed from Washington, D.C. on December 29, 2007, flying by military aircraft first to California for refueling, then on to a mandatory crew rest overnight stop at Hickham airbase in Hawaii. After a briefing on base operations and meetings with some of our servicemen and women who are stationed there, we proceeded on to Christchurch, New Zealand, stopping along the way at Pago Pago, American Samoa for brief refueling.

We arrived at Christchurch, New Zealand in the evening, then had a New Year's Eve dinner together at a local restaurant. After dinner we watched the town fireworks from just outside the restaurant, then all retired for bed after a long day of travel.

The next morning we visited the [Antarctic Passenger Terminal](#), (an NSF facility) which is where passengers to the continent depart from. We were fitted with special clothing and other equipment, and briefed about the base and upcoming flight. After receiving our gear and briefing, we visited the International Antarctic Center and the U.S. "Deep Freeze" station, which provides the operational, logistical, and air base for the U.S. mission to Antarctica. This was followed by a lunch with New Zealand's Minister of Energy, as well as Members of New Zealand's Parliament and other government officials.

Wednesday morning, January 2nd, we dressed in our cold weather clothing and flew in a National Guard C-17 Globemaster to the ice landing field at McMurdo station. The flight was filled to capacity with equipment and scientists making the trip. As a side note, before landing the flight had to circle the base for a bit as a couple of [penguins](#) were shuffled off the landing strip.

From the landing field we rode a huge, tired "terra bus" across the ice to the station at McMurdo. Upon arriving, we met with the director of the program as well as a number of top scientific researchers. This included a "windshield tour" of the station, as well as walking tours of the new science labs and discussions with scientists about the nature and findings of their research.

After these visits, it was time for sleep and most of my colleagues retired for the evening. However, since it was still broad daylight at midnight, I decided instead to join the base director for a climb up Observation Hill. This small hill afforded a great view of the

station and up the distant glaciers; historically it had been used to watch for expeditions returning from the pole. The McMurdo program director used our climb and summit vantage point to discuss the history of the station, the explorations there, and to describe the geology of the hill itself and the surrounding glaciers. The temperature at the time was ten or fifteen degrees above zero with a 25 mph hour wind.

The next morning we boarded a C-130, once again fully laden with gear and researchers, this time destined for the South Pole and the newly completed Amundsen-Scott Research Station. After a five hour flight in cramped seating (which was familiar to those of us who have traveled to Iraq and Afghanistan), we arrived at the Pole Airfield, elevation 10,000 ft.

Once there, we received a briefing about the station and research being conducted. Then we joined scientists and staff for lunch, which was followed by visits to the truly amazing work being done on the [IceCube](#) Neutrino facility and the microwave [South Pole Telescope](#).

Among the many remarkable things about these two programs is that they cannot be done anywhere else on Earth. More information is available on the internet, but it is extraordinary to see the IceCube project hot water drilling bore holes in the ice a kilometer deep, into which are placed spherical detectors hung like beads in a giant cubic array to detect subatomic particles that have passed through the entire Earth before being detected by the receptors deep in the ice.

Equally impressive is the microwave South Pole Telescope, which takes full advantage of the high elevation, the clear dry air and the polar location to gather celestial signals from distant galaxies. This information will help answer fundamental questions about “Dark Energy” and the makeup of the universe itself.

Another experimental facility we were fortunate to observe in flight is an extremely high altitude balloon which carries astronomical and other observational tools. Because of the unique wind circulation around the continent, this balloon and its research payload is able to circle the continent for many days and return to essentially the same place for retrieval. This novel method has won international prizes and produced key information about the cosmos.

We then met with climate scientists who have been monitoring atmospheric conditions, including concentrations of carbon dioxide and other greenhouse gasses for many years. Their data shows a clear and steady increase of these gasses even as measured in the relatively pristine environment of Antarctica. Other research at the pole and elsewhere on the continent is dedicated to monitoring the movement and thickness of the ice sheets and glaciers.

Finally, our delegation posed for photos at the South Pole itself. Then it was back to the C-130s for the return flight to McMurdo.

We arrived late, but again, as always during that time of the year, in broad daylight. At McMurdo we had a reception with some of the top scientists to further discuss research being conducted there.

The next morning, we embarked early by helicopter to visit some of the inland research sites. This trip included visits with researchers studying glacial movement, the geology of the region, and biology of some of the glacial lakes and streams. Of particular interest was the Dry Valley area, an aptly named place which is one of the driest areas on Earth. It is utilized as a test bed for equipment being used for Mars exploration. This link to NASA was of particular interest for those of us who also serve on the Space and Aeronautics Subcommittee.

Also part of this journey were stops at penguin colonies that have been the focus of continuous research for many years. Meeting with the scientists at these colonies we learned that recent years have seen severe storms which have completely buried the birds in snow as they sat on their nests. This has not been seen previously and has resulted in dangerously high mortality for eggs and parents alike. The researchers suspect such storms may be indicative of climate change.

Following these visits and a fascinating stop at the historical base camp of Scott, we returned to McMurdo and boarded our return flight to New Zealand where we overnighted.

Australia – the Great Barrier Reef and Kurunda Rainforest

From Christchurch, we left early for the five hour flight to Cairns, Australia, arriving there late in the morning. The afternoon was unscheduled for members so I elected to take, at personal expense, an excursion to a near shore island to do a single shallow water dive on what I had heard was a heavily damaged reef system indicative of what is happening from tourism impacts. That, in fact, proved to be the case and revealed what is happening to near shore reefs due to excessive tourist diving, runoff and other factors.

In order for the entire delegation to learn more about the threats to the reefs, the next day we all traveled together by boat, accompanied by staff from the Great Barrier Reef Marine Park, NOAA scientists and Ove Hoegh-Guldberg. On the way to the reef, we received extensive Power Point presentations and lectures from the scientists as well as opportunities for individual and small group discussions.

We then stopped at two points along the reef for the opportunity to snorkel or scuba dive and see what the scientists had been talking about. Under the water, we could see with our own eyes examples of bleached coral, plus coral that had been broken off by divers or boats. We also saw what wasn't there; namely the notable lack of a number of species that should have been present in abundance if the reef had been healthy.

I first learned to scuba dive after being elected to Congress because I had become concerned about the fate of our oceans and wanted to be able to see and learn more first

hand about what was happening. At the Great Barrier Reef, I was shocked and deeply troubled by the degraded condition. Clearly, the combined impacts of warming, acidification, runoff, fishing, excessive tourism and diving pressure are having extremely detrimental effects.

As I said at the time,

“You cannot call the Great Barrier Reef great anymore. I could not have fully appreciated the damage had I not seen it with my own eyes. It is heartbreaking, overwhelming really, to think that our children and grandchildren may never be able to see a real, healthy reef in their lifetimes. It is even more troubling to know that things are actually going from bad to much worse at a frightening rate.”

I was not the only member of our trip to have this reaction. The return trip to the mainland afforded time for further lecture and discussion about what we had just seen and about other topics related to reef and ocean health. Upon arrival at the hotel, most members retired early after a long day.

The next morning, the Honorable Desley Boyle, Minister of Tourism for Queensland briefed the delegation at breakfast. From the Minister we learned not only about tourism and environmental issues, but also about the recent Australian elections, which had been heavily influenced by concerns about climate change.

Then we traveled to the Kurunda Rain Forest, the third type of major ecosystem being affected by overheating of the planet. The lecture by scientists there was striking. Using sophisticated mapping and ecological data, they showed in graphic detail how even modest temperature increases would impact the vegetation and animal life at different elevations and microclimates of the rainforest. We then took a skyrail and hiking tour to, again see firsthand, what the scientists had been referring to and how it would be affected.

Return

Having now seen three major imperiled ecosystems in as many days, we returned to Cairns, from which we departed in the early evening, flying through the night to Pago Pago, then on to Hickham AFB again the next morning. There we met with base commanders and again with different service members from each of our districts. This was followed by a tour of the Pacific Fleet, briefings about NOAA's pacific regional center and environmental research programs, and finally, the laying of a wreath at the U.S.S. Arizona Memorial.

The evening was spent in Honolulu, and we departed January 8th at 6:30 in the morning for the flight home, eventually arriving at Andrews AFB around 10 PM.

Impact

It was extraordinarily informative to see firsthand the remarkable facilities our nation has installed in Antarctica and the invaluable research being performed there. It is impossible to overstate the importance of this trip on my understanding of the issues facing our planet and what we must do about them.

I have long been interested and always considered myself relatively well informed about the environment in general, but meeting firsthand with some of the world's leading scientists and being able to see what they are studying and finding was extraordinary. It is one thing to read about coral reef degradation, or the impacts of climate change on penguins or ice sheets, or what is happening to rain forests. It is another thing to actually see those changes with one's own eyes, see firsthand the laboratory and field studies, and have a context for what one is reading or hearing about in scientific journals and official briefings.

The trip was transformative for me, as I believe it was for John McCain and has been for many other colleagues as well. I brought back not simply knowledge, but renewed commitment to move the scientific research agenda forward and to take real, tangible and immediate steps in my personal life, my Congressional office, and through legislation, to address the problems we had witnessed.